The applicants respectfully suggest that perhaps all of the paperwork upon 30 month entry (Aug 26, 2000) into the National Stage did not reach the Examiner prior to his examination. This paperwork includes the TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35U.S.C. 371 and a request that only 20 claims (including 3 independent claims) be examined. In addition the applicants filed amendments (with replacement pages) to the specification which applicants judged did not add new matter to the specification. A copy of this paperwork is included herewith to aid in placing the application in condition for allowance.

Dependent claims 20 and 50 have been amended (see above) so that these claims depend only from claims still pending in the US National Application.

With regard to the Examiner's point 1, Examiner's objection to the specification because it lacks a heading and section "Brief Description of the Drawings", the applicants respectfully submit an amendment to the specification (see above) to include a heading and section "Brief Description of Drawings". In view of this amendment to the specification, the applicants respectfully request that the objection be withdrawn.

With regard to the Examiner's point 2 A), of claims 1 and 2 under 35 U.S.C. 112, second paragraph, applicants respectfully submit that claims 1 and 2 were never pending in the US National Application.

With regard to the Examiner's point 2 B), rejection of claims 21, 30, 51, and 53 under 35 U.S.C. 112, second paragraph, applicants respectfully submit that claim 30 was never pending in the US National Application; and the Examiner's rejection of claims 21, 51 and 53 are respectfully traversed below.

With regard to the Examiner's point 2 C), rejection of claim 23 under 35 U.S.C. 112, second paragraph as being indefinite because of confusing language "as in any one of claim 22", applicants have respectfully responded by amending claim 23 and deleting the words "any one of" (see above) to correct this informality. Withdrawal of this rejection is respectfully requested.

With regard to the Examiner's point 2 D), rejection of claims 28 and 29 under 35 U.S.C. 112, second paragraph, applicants respectfully submit that claims 28 and 29 were never pending in the US National Application.

With regard to the Examiner's point 2 E), rejection of claims 24-27, 31, 32, and 54-58 under 35 U.S.C. 112, second paragraph, applicants respectfully submit that claims 24-27, 31, 32, 55, 56 and 58 were never pending in the US National Application. Only claims 54 and 57 are pending in this application.

Claims 54 and 57 are rejected under 35 USC 112, second paragraph as being indefinite. The Examiner states that, "These claims are not in proper 'means plus function' format, as they merely refer to steps of the prior method claims. Thus, it is completely unclear what apparatus is encompassed by the claims, and on what basis a prior art search should be conducted." Applicants have responded by canceling claims 54 and 57, and each of claims 54 and 57 has been replaced by an equivalent claim, claim 97 and claim 98 respectively, that is in proper "means plus function" format for U.S. patent practice. (Applicants assert that no claims have been narrowed within the meaning of *Festo*.)

Applicants now respectfully submit that the claims 97 and 98 are in a format that invokes examination under 35 USC 112 paragraph 6. Applicants respectfully submit that structure is present in the patent application that supports claims 97 and 98. Supporting structure for claims 97 and 98 is cited for example on page 30 line 23 and page 33 line 20 to page 35 line 2 (Oligonucleotide Technology). Supporting structures of Oligonucleotide Technology and Mass Spectrometry are recited in canceled claim 57 and new claim 98. In addition, applicants respectfully submit that supporting structure is linked to claims 97 and 98 through p. 30 lines 6 and 7 in that the apparatus claims "obtain genotype data/sample allele frequency data similar to the data of step d) of process #1". And details of some technology for carrying out step d) of process #1 are given on page 23 line 25 to page 24 line 2.

Applicants also respectfully submit that claims 97 and 98 are also linked to supporting structure for carrying out "d)means for obtaining genotype data/sample allele frequency data" by page 29 line 2. And details of some technology for carrying out means d) is recited on page 29 lines 17 to 30. This recited technology includes computer means, an example of such means obtain data (or are supplied with appropriate data) to calculate genotype data/ sample allele frequency data. For example, sample allele frequency data can be calculated from genotype data for individuals in a sample.

The recitation of supporting structure for apparatus claims 97 and 98 in the previous two paragraphs is not exhaustive. Applicants respectfully submit that under 35 USC 112, paragraph 6, the claims encompass structure recited in the specification and any equivalents thereof.

The applicants respectfully submit that equivalents of recited structure include older technologies, such as technologies for genotyping microsatellites, minisatellites, SNPs and STRs. Such technologies often work with larger molecular fragments, such as larger nucleic acid fragments. Examples include gel-based genotyping technologies, blot techniques (Southern, Northern, Western; some blot techniques analyze proteins or peptides), RFLP technologies, restriction enzyme technologies, electrophoretic methods. Some of these technologies or equivalent technologies genotype by analyzing DNA, RNA or proteins (peptides). An example of a protein based genotyping method is the Protein Truncation Test (circa 1995). Some of these older technologies are discussed in references in footnotes 1 (Reed, et al) and 2 (Levinson, et al) of the Background page 3.

The applicants respectfully submit that equivalents of recited structure (including structure recited under Oligonucleotide Technology) include technologies that use oligonucleotides (or an equivalent) as probes. Such probes include oligonucleotides that are DNA or RNA or an equivalent molecule having a sequence of nucleotides (or equivalents) such as PNA (peptide nucleic acid). The applicants respectfully submit that equivalents of recited structure (including structure recited under Oligonucleotide Technology) include technologies that use DNA (or an equivalent) as targets. Such equivalent targets include RNA (RNA is used as a target by versions of TaqMan, p.34 line 17) and proteins (or peptides).

Applicants respectfully submit that various forms of technologies that use enzymes such as for enzymatic discrimination are equivalents. Examples of such equivalents use ligase enzymes (oligonucleotide-specific ligation, p.34 lines 16 and 17), primer extension (such as PCR, p. 34 line 9), restriction enzymes (such as in RFLP technology), cleavase enzymes such as various "invader assays", or other discrimination enzymes and are equivalents to recited structure.

Most of the recited techniques use one or more oligonucleotides (or equivalents) at some stage of their methodology such as described under Oligonucleotide Technology in the application. Many of these recited techniques use some form of "molecular separation", such as electrophoresis or mass spectrometry. Many or most of these techniques generate a physico-chemical signal (p. 21 line 1 of the patent application). Applicants respectfully submit that equivalents include techniques which use a combination of methods or technologies (or equivalents) recited herein.

Applicants respectfully submit that terms and some of the equivalents recited herein are sometimes acronyms or referred to by acronyms. A list of some defined acronyms is supplied herewith. Many of the acronyms in the defined list have meanings that are the same or similar to acronyms used herein and are supplied as an aid. A separate listing of these acronyms which are defined with paper references (14 pages) is included with this Response. These acronyms are exemplary and nonlimiting and are stated in the following list. **Arbitrary primed marker:** AP-PCR, DAF, DFP, ISSR, MAAP, OP, RAMP, RAPD, SPAR, SSR-anchored, **Non-Arbitrary primed marker:** AFLP, ASO, ASAP, AS-PCR, CAPS, DAMD, DOP-PCR, EST, ISTR, REP-PCR, SCAR, STMS, STR, SRFA, SSLP, SSR, SAMPL, S-SAP, STS, VNTR, **SNP detection systems:** DOL, FRET, MADGE, MASDA, MB, OLA, TaqMan, **Hybridization based marker:** CFLP, GMS, RAMCM, RFLP, **Gel systems:** 2-DDGE, DGGE, FIGE, PFGE, SCGE, SSCP, TGGE, **Molecular methods:** ASSURE B, DDRT-PCR, HAPPY, MATS, PRINS, RDA, REMI, REMI-RFLP, RICH, SDA, **DNA Amplification methods:** IPCR, LCR, NASBA, PCR, RCA, SSI, **Miscellaneous:** BAC, BSA, GS, LOD, MAS, MARS, MITE, MSAP, PIC, QTL, YAC

The applicants respectfully submit that the recitation of equivalents here is not exhaustive and that the number of equivalents is so great that it is nearly impossible to submit an exhaustive list. This is an area of intense and ongoing interest. There are, however, persons in the art who are extremely knowledgeable regarding equivalents. **However, applicants respectfully submit that despite the large number of equivalents, that no recited technique or equivalent is directed toward obtaining genotype data/sample allele frequency data (or equivalents) at two or more bi-allelic markers (or equivalents), wherein the markers systematically cover a CL-F region.**

Applicants respectfully submit that claims 97 and 98 are in a searchable format, and respectfully request examination of claims 97 and 98.

With regard to the Examiner's point 2 F), rejection of claims 59-77 under 35 U.S.C. 112, second paragraph, applicants respectfully submit that claims 59-77 were never pending in the US National Application.

With regard to the Examiner's point 3), rejection of claims 1, 2 and 59-77 under 35 U.S.C. 101 applicants respectfully submit that claims 1, 2 and 59-77 were never pending in the US National Application.

The Examiner's other rejections are respectfully traversed below.

Rejection under 35 U.S.C 112, second paragraph

With respect to the Examiner's point 2 B), rejection of claims 21, 30, 51 and 53 under 35 USC 112, second paragraph, only claims 21, 51 and 53 are pending in this application. Claims 21, 51 and 53 are rejected as being indefinite because it is unclear how a process can "comprise a computer program". The Examiner suggests that the applicants may wish to amend the claims to recite a process which comprises the use of a computer program.

The applicants respectfully traverse the Examiner's rejection on this point with respect to claims 21, 51 and 53. The term "comprises" is essentially synonymous with the term "includes" or "contains" (see MPEP 2111.03). A computer program is a process or method. A process, such as is claimed in claims 21, 51 and 53 can contain or include a method such as a computer program. Applicants respectfully submit that claims 21, 51 and 53 satisfy the requirements under 35 U.S.C. 112 second paragraph and are definite. Withdrawal of this rejection is respectfully requested.

Conclusion

For all the reasons advanced above, Applicants respectfully submit that the application is in condition for allowance and that action is earnestly solicited.

Sincerely,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE CLAIMS

In the claims:

The applicants respectfully submit that only claims 3, 4, 5, 7, 8, 20, 21, 22, 23, 33, 34, 35, 37, 38, 50, 51, 52, 53, 54, and 57 were ever pending in the present US National Stage application.

Claims 20, 23, and 50 have been amended as follows:

20. (ONCE AMENDED) A process as in any one of claims 3-[19] 5, 7 or 8, wherein there is a subgroup of the covering markers, and the markers in the subgroup are a majority of the covering markers, and each marker in the subgroup is an SNP, or a bi-allelic marker equivalent formed only from one or more SNPs.

23. (ONCE AMENDED) A process as in [any one of] claim 22, wherein the process comprises a computer program.

50. (ONCE AMENDED) A process for obtaining genotype data/sample allele frequency data as in any one of claims 33-[49]35, 37 or 38, wherein there is a subgroup of the covering markers, and the markers in the subgroup are a majority of the covering markers, and each marker in the subgroup is an SNP, or a bi-allelic marker equivalent formed only from one or more SNPs.

Claim 54 has been cancelled and replaced with a replacement claim 97.

Claim 57 has been cancelled and replaced with a replacement claim 98.